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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,310	11/13/2001	Michael Windhager	P2159	8617

7055 7590 01/05/2004

GREENBLUM & BERNSTEIN, P.L.C.  
1950 ROLAND CLARKE PLACE  
RESTON, VA 20191

EXAMINER
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MORILLO, JANELL A

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 01/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/869,310

**Applicant(s)**

WINDHAGER ET AL.

**Examiner**

Janelle Combs-Morillo

**Art Unit**

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 56-111 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 85-111 is/are allowed.
- 6) ☒ Claim(s) 56-63, 66-71, 73-77 and 81-84 is/are rejected.
- 7) ☒ Claim(s) 64, 65, 72 and 78-80 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 56-63, 66-71, 73-77, 83, and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nawata.

Nawata teaches a compound roll having a shell portion (typically 70 mm thick, column 9 lines 51-52) made of a hard cast iron comprising the composition listed in the Table below (see Nawata at abstract, etc.). Nawata teaches the graphite particle population is dependent on the carbon content (column 2 lines 3-4, column 3 line 32). Nawata also teaches that said shell has excellent wear resistance and resistance to surface roughening (column 2 lines 47-48).

Concerning independent claim 76, Nawata teaches that the core portion of the compound roll is made of a tough cast iron or steel (which broadly overlaps the presently claimed low-alloy cast iron), while the shell portion is made of a hard cast iron (abstract). Nawata teaches the compound roll shell portion has a thickness typically 70 mm (column 9 lines 51-52), which falls within the presently claimed thickness ranges. Nawata teaches that by incorporating Mn (column 3 line 55), Ni (column 4 line 10), and Cr (column 4 line 17), hard phase of martensite is able to be formed in said alloy.

Nawata does not teach a) the amount or distribution of graphite particles precipitated, or b) the amount of eutectic and mono carbides precipitated, or c) the Shore C hardness (indep. Claim 76).

Concerning items a) and b), Nawata teaches that the graphite and carbide precipitates dependent on composition (as stated above) and cooling rate (column 2 lines 7-10), and poor resistance to wear and surface roughening occur when too many graphite particles and too few carbide particles are present (column 2 lines 10-16). The examiner points out that changes in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e. they produce a new and unexpected result. However, said parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Because Nawata teaches that the population of graphite and carbide precipitates are result effective variables (wherein the recognized result is wear resistance and surface roughening), it would have been obvious to one of ordinary skill in the art to determine the optimum or workable ranges of said variables.

Concerning item c), as stated above, Nawata teaches said steel is a *hard* cast iron (column 2 line 46) with excellent wear resistance and resistance to surface roughening (column 2 lines 47-48). However, Nawata does not teach the Shore C hardness value of said steel. However, the examiner asserts that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical

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processes, a prima facie case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). “When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.” *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Because Nawata teaches a substantially overlapping alloy composition, then substantially the same properties, such as Shore C hardness, is expected to occur.

	C	Si	Mn	Cr	Ni	Mo	Al	V	Nb	Ta	graphite	eutectic carbides	V, N carb
claim 56	2.0-3.5	1.0-2.0	0.5-2.0	1.0-3.0	3.5-4.9	0.20-2.9	0-0.65	0.5-6.9	0-0.6 (as a replacement to V)	0-0.6 (as a replacement to V)	1.0-3.0 vol%, 20-100 particles/mm <sup>2</sup>		
57	2.2-3.1							1.8-4.9			1.2-2.5 vol%, 22-60 particles/mm <sup>2</sup>		
58				1.2-2.5		0.5-2.1		1.5-4.9					
59	C/Si <= 2.6												
60	C/Si <= 2.6												
61	2.6-2.95												
62		1.2-1.85											
63		1.4-1.75											
64							0.002-0.65						
65							0.005-0.04						
66					3.5-4.7								
67					4.16-4.6								
68						Mo/Cr <1.0							
69						Mo/Cr <0.8							
70				1.5-2.01		0.3-0.9							
71								1.8-3.9					
72								1.9-2.95					
73												8-35 vol%	1-15
74												10-25 vol%	2-10
75													
76											1.0-2.5 vol%, 20-100 particles/mm <sup>2</sup>	8-35 vol%	1-20
77											1.0-2.5 vol%, 22-100 particles/mm <sup>2</sup>	10-25 vol%	2-10
78	2.0-3.5	1.0-2.0	0.5-2.0	1.0-3.0	3.5-4.9	0.20-2.9	0.002-0.65	0.5-5.9	0-0.6 (as a replacement to V)	0-0.6 (as a replacement to V)			
79	2.21-3.1	1.2-1.85	0.6-1.6		3.5-4.7		0.005-0.1	1.8-3.9					
80	2.6-2.95	1.4-1.75	0.7-1.4	1.5-2.01	4.16-4.6	0.3-0.9	0.005-0.04	1.9-2.9					
81								3.1-3.9					
82								3.3-3.75					
EP068	2.0-4.0	0.5-4.0	0.1-1.5	1.0-7.0	0.2-4.0	2.0-10	-	2.0-8.0	-	-	0.5-5%		0.2-
Nawata	2.5-3.5	0.5-1.5	0.5-1.5	1.0-2.5	3.0-5.0	0.1-1.5	-	0.1-2.0	0.1-2.0	-	-	-	-

Concerning dependent claims 57, 58, 61-63, 66, 67, 70, 71, 73-77, Nawata teaches an overlapping alloy composition as described in the table below. As stated above, substantially the

same graphite and carbide compounds are expected to occur for the substantially overlapping alloy taught by Nawata.

Concerning dependent claims 59, 60, 68, and 69, as seen in the Table below, Nawata teaches ranges for C and Si, as well as Mo and Cr that overlap the presently claimed ratio ranges.

Concerning dependent claim 83, as stated above, Nawata teaches that said core is made of a tough cast iron or steel, as opposed to the shell that is made of a hard martensitic cast iron (see abstract). The examiner submits that the presently claimed “ductile iron” is within the scope of Nawata’s teaching of using a tough cast iron or steel.

Concerning dependent claim 84, Nawata doesn’t teach the bending strength of said shell steel. However, as stated above, because Nawata teaches a substantially overlapping alloy composition, then substantially the same properties, such as bending strength, are expected to occur (the above reasoning with respect to Shore C hardness, also applies here).

3. Claims 56-63, 66, 68, 69, 71, 73-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 665068 A1 (EP’068).

EP’068 teaches a wear and seizing resistant compound roll for hot rolling (page 4 line 4) having an outer portion (typically 60 mm thick, page 9 lines 56-57) made of a hard cast iron comprising the composition listed in the Table above (see EP’068 at abstract, page 4 lines 7-9), which overlaps the presently claimed composition ranges. EP’068 teaches that said alloy has a metal structure comprising: a matrix comprising martensite (page 13 line 53), 0.5-5% in area ratio graphite, 0.2-10% in area ratio of MC carbides (page 4 lines 1-2), and 0.2-20% other carbides (such as  $M_2C$ ,  $M_6C$ , etc. see page 5 lines 5-8). MC carbides include vanadium carbides

(page 6 lines 1-6), while “other carbides” of EP’068 include eutectic carbides of the instant invention.

EP’068 does not teach the distribution and number of graphite particles. However, as stated above, EP’068 does teach the overall area% of graphite particles, and because the area ratio overlaps, then the amount of particles/mm<sup>2</sup> is also expected to overlap. Therefore, it is held that EP’068 has created a prima facie case of obviousness of the presently claimed invention.

Concerning dependent claims 57, 58, 61-63, 66, 71, 73-75, EP’068 teaches an overlapping alloy composition as described in the table above. As stated above, substantially the same graphite and carbide compounds are expected to occur for the substantially overlapping alloy taught by Nawata.

Concerning dependent claims 59, 60, as seen in the Table above, EP’068 teaches ranges for C and Si, as well as Mo and Cr that overlap the presently claimed ratio ranges.

4. Claims 76, 77, 83, and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 665068 A1 (EP’068) in view of Nawata.

EP’068 teaches a wear and seizing resistant compound roll for hot rolling (page 4 line 4) having an outer portion (typically 60 mm thick, page 9 lines 56-57) made of a hard cast iron comprising the composition listed in the Table above (see EP’068 at abstract, page 4 lines 7-9), as well as containing graphite particles, eutectic carbides, and vanadium carbides within the presently claimed ranges (see discussion above). EP’068 does not mention a) the core of the composite chill roll is a low alloy cast iron or b) the Shore C hardness.

Concerning item a), as stated above, Nawata teaches that the core portion of the compound roll is made of a tough cast iron or steel (which broadly overlaps the presently

claimed low-alloy cast iron). It would have been obvious to one of ordinary skill in the art to use a tough low alloy cast iron or steel for the core portion (as taught by Nawata) of the compound roll for roll forming with the shell taught by EP'068, because Nawata teaches that it is conventional to have a hard outer layer and a ductile and tough inner layer (column 1 line 7, column 2 lines 47-48) in order to provide a compound roll with excellent properties.

Concerning item b), EP'068 does not teach the Shore C hardness value of said steel. However, the examiner asserts that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Because EP'068 teaches a substantially overlapping alloy composition, then substantially the same properties, such as Shore C hardness, is expected to occur.

Concerning dependent claim 83, as stated above, EP'068 teaches that said core is made of a tough cast iron or steel. The examiner submits that the presently claimed "ductile iron" is within the scope of Nawata's teaching of using a tough cast iron or steel.

Concerning dependent claim 84, EP'068 doesn't teach the bending strength of said shell steel. However, as stated above, because EP'068 teaches a substantially overlapping alloy composition, then substantially the same properties, such as bending strength, are expected to occur (the above reasoning with respect to Shore C hardness, also applies here).



***Response to Arguments/Amendments***

5. In the response filed on October 3, 2003, applicant canceled claims 31-55 and added new claims 85-111.

Applicant's argument that the present invention is allowable over the prior art of record because Nawata does not teach a suggestion to optimize both the number and volume fraction of graphite particles (arguments page 22-23) has not been found persuasive. Nawata teaches that "the high-alloy cast iron is a material in which graphite particles are inherently likely to be precipitated" (column 2 lines 3-4) and that "the shell portion of the compound roll is required to have an increasingly finer metal structure with higher uniformity" (column 1 line 68- column 2 line 2), which is obtained by centrifugal casting at a rapid cooling speed (column 1 lines 10-11). Because Nawata teaches that the population of graphite and carbide precipitates are result effective variables (wherein the recognized result is wear resistance and surface roughening), it would have been obvious to one of ordinary skill in the art to determine the optimum or workable ranges of said variables.

Applicant's argument that the present invention is allowable over the prior art of record because EP'068 does not teach motivation to optimize the number of graphite particles (arguments pages 25-26) has not been found persuasive. Though EP'068 gives an area ratio of graphite particles and not volume ratio of graphite particles, an area ratio, when taken over a given thickness IS a volume ratio. Therefore, the particles/mm<sup>3</sup> are expected to overlap, substantially as set forth above. Additionally, EP'068 teaches that it is known that the crystallization of graphite particles, which serve as solid lubricants, improves seizing resistance in a roll (page 3 lines 19-20).

Applicant's argument that the present invention is allowable over the prior art of record because EP'068 teaches different preferred alloying elements has not been found persuasive. EP'068 teaches an overlapping alloy composition, as stated above. Overlapping ranges have been held to be a prima facie case of obviousness, see MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art to select any portion of the range, including the claimed range, from the broader range disclosed in the prior art, because the prior art finds that said composition in the entire disclosed range has a suitable utility.

Applicant's argument that the present invention is allowable over the prior art of record because EP'068 teaches a special technique to achieve the desired amounts of graphite has not been found persuasive. Applicant has not clearly shown that said special technique would materially effect the product taught by EP'068.

***Allowable Subject Matter***

6. Claims 64, 65, 72, 78-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. Claims 85-111 are allowable over the prior art of record.
8. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest an iron alloy with the presently claimed ranges of C, Si, Mn, Cr, Ni, Mo, V and optionally replaced by Nb and Ta, the instant phase composition(s), complete with the presently claimed range of aluminum.

***Conclusion***


9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Jcm   
December 22, 2003

ROY KING  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1100